

INCH-POUND

MIL-PRF-6106/38C
10 November 2000
SUPERSEDING
MIL-PRF-6106/38B(USAF)
15 September 1993

PERFORMANCE SPECIFICATION

RELAY, ELECTROMAGNETIC, TYPE I, MAGNETIC LATCH, PERMANENT
MAGNET DRIVE, LOW LEVEL TO 5 AMPERES, 2PDT,
HERMETICALLY SEALED

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the relay described herein shall consist of this specification and the latest issue of MIL-PRF-6106.

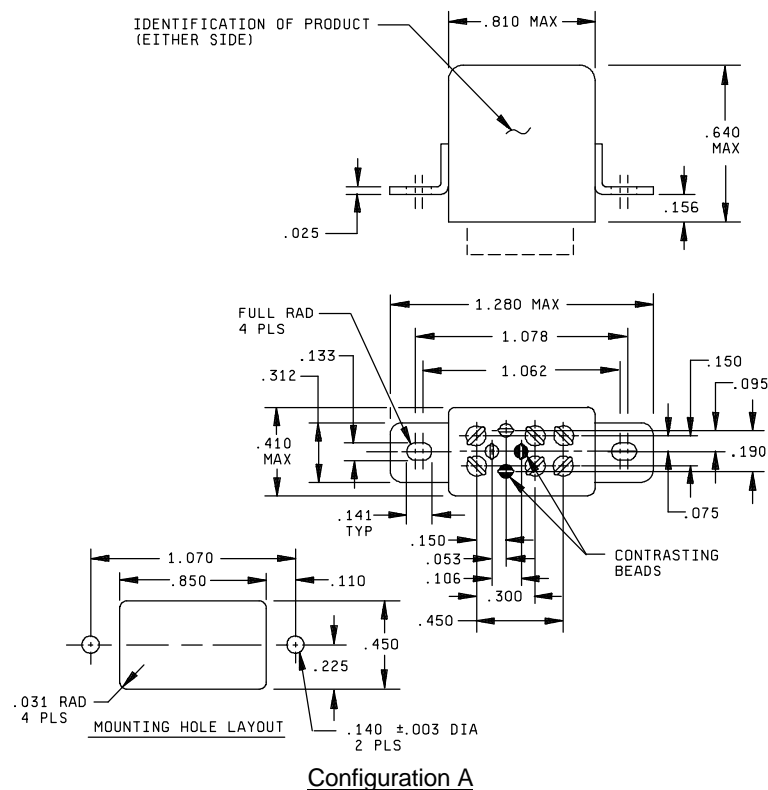


FIGURE 1. Outline drawing.

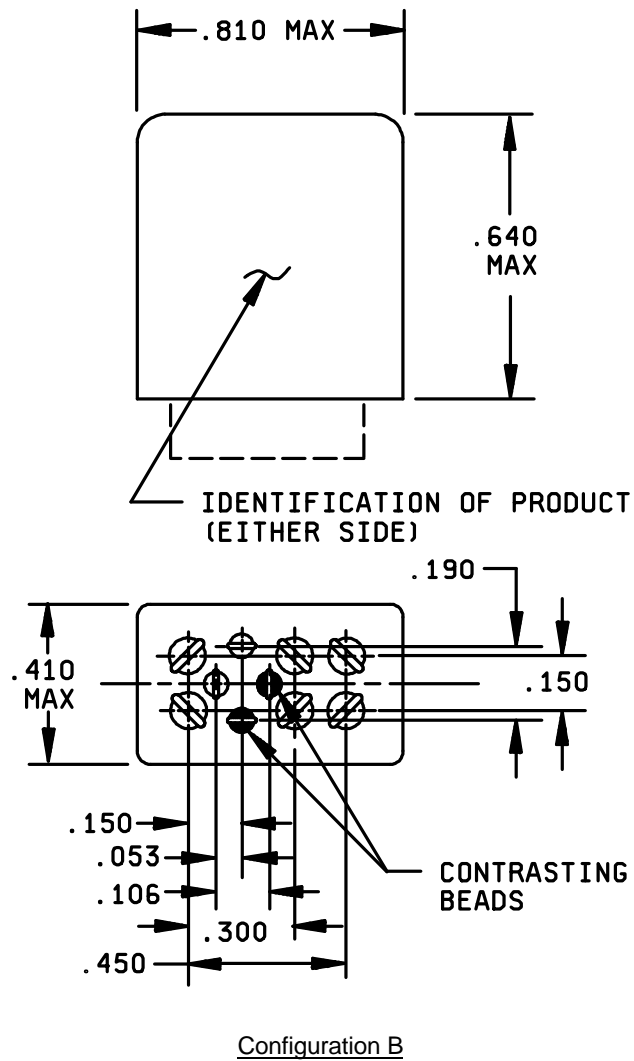


FIGURE 1. Outline drawing - Continued.

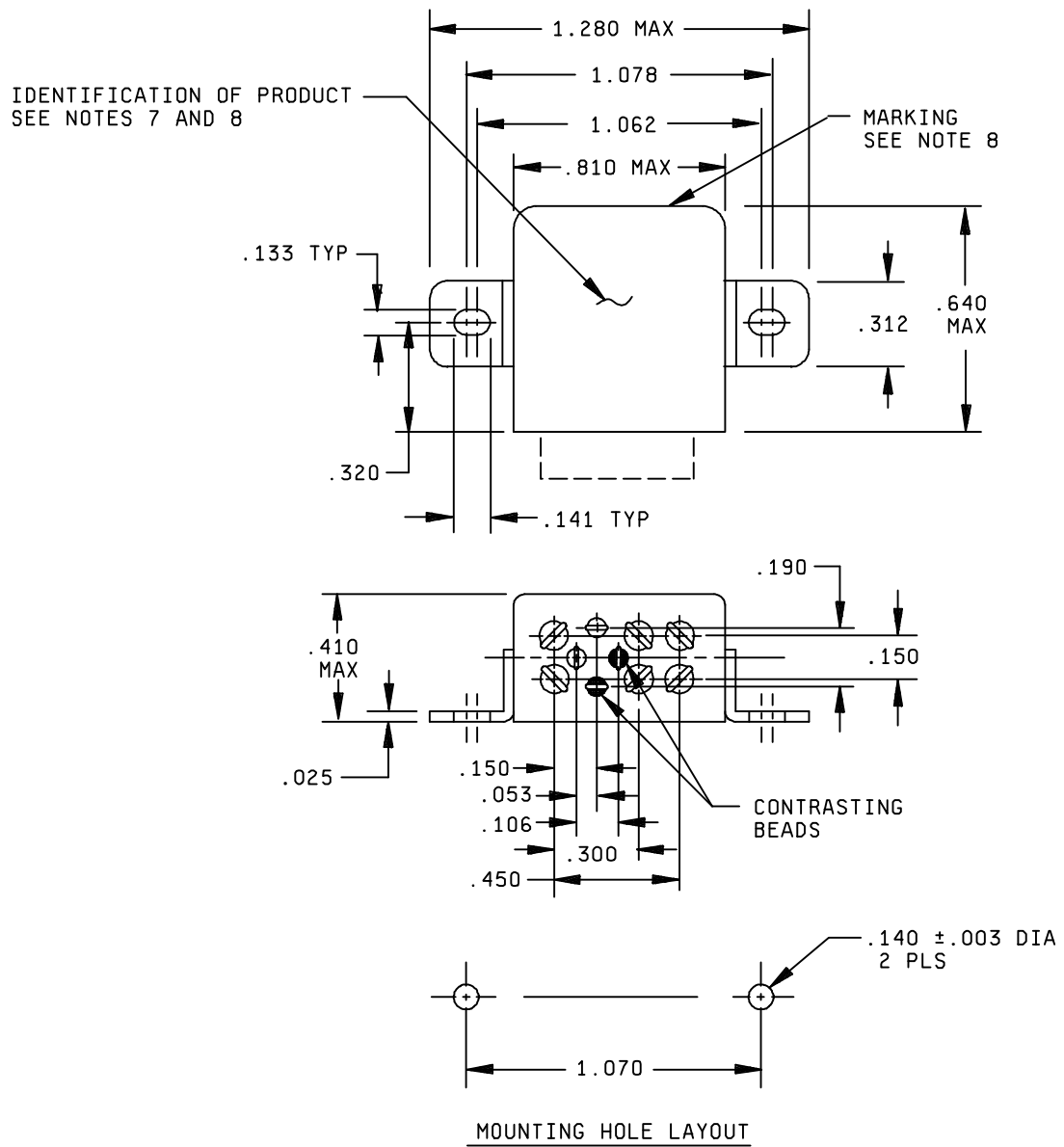
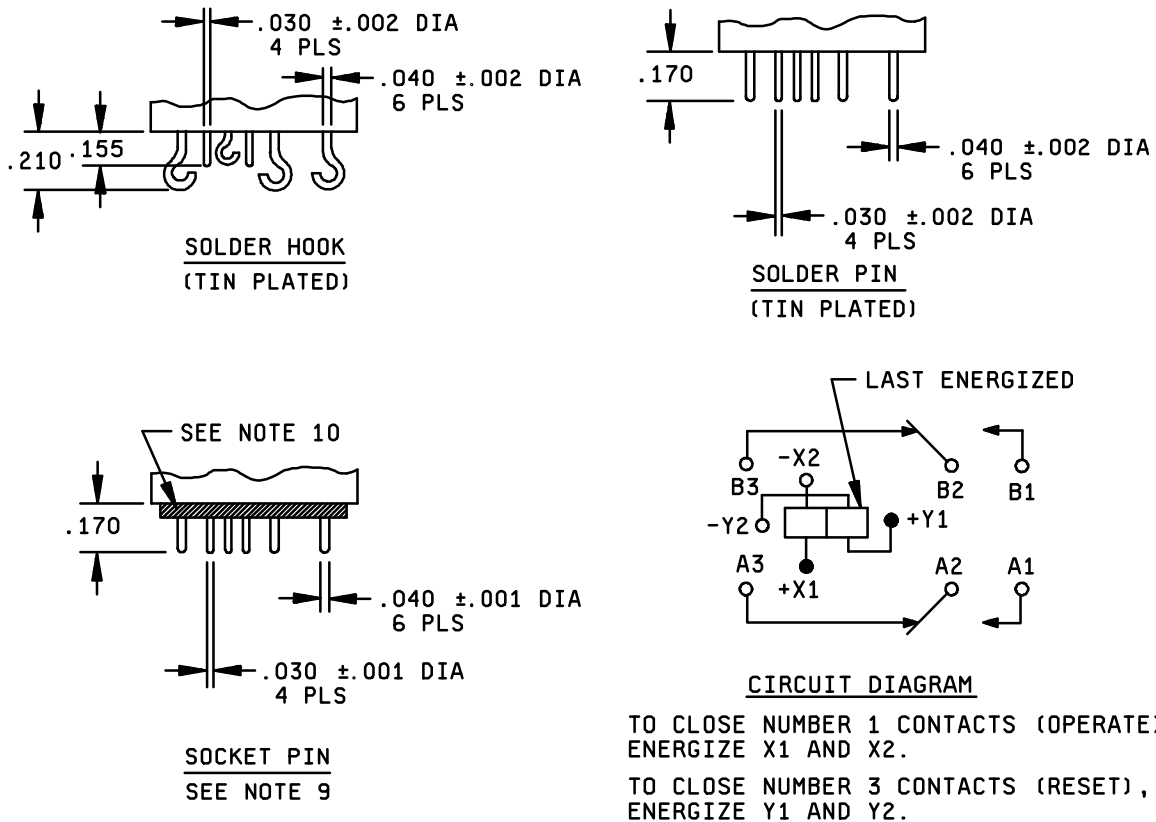


FIGURE 1. Outline drawing - Continued.



TO CLOSE NUMBER 1 CONTACTS (OPERATE),
ENERGIZE X1 AND X2.
TO CLOSE NUMBER 3 CONTACTS (RESET),
ENERGIZE Y1 AND Y2.

FIGURE 1. Outline drawing - Continued.

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| Inches | mm | Inches | mm | Inches | mm |
|--------|------|--------|------|--------|-------|
| .001 | 0.03 | .106 | 2.69 | .300 | 7.62 |
| .002 | 0.05 | .133 | 3.38 | .312 | 7.92 |
| .003 | 0.08 | .140 | 3.56 | .410 | 10.41 |
| .005 | 0.13 | .141 | 3.58 | .450 | 11.43 |
| .025 | 0.64 | .150 | 3.81 | .640 | 16.26 |
| .030 | 0.76 | .155 | 3.93 | .810 | 20.57 |
| .031 | 0.79 | .156 | 3.96 | .850 | 21.59 |
| .040 | 1.02 | .170 | 4.32 | 1.062 | 26.97 |
| .053 | 1.34 | .190 | 4.82 | 1.070 | 27.18 |
| .075 | 1.90 | .210 | 5.33 | 1.078 | 27.38 |
| .095 | 2.52 | .225 | 5.72 | 1.280 | 32.51 |

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are ± 0.010 (0.25mm).
4. There shall be affixed to the relay a legible circuit diagram that identifies each terminal location specified.
5. These relays are polarized bistable.
6. Permanent magnet drive consists of a permanent magnet with its flux path switched and combined with the electromagnetic flux.
7. Applicable to configuration C only. The circuit diagram, manufacturer's PIN, and the military PIN shall be marked on the near side. The remaining portion of the nameplate data shall be marked on the far side.
8. Applicable to configuration C only. Relays shall be marked with the manufacturer's name or source code and date code. In addition, ER relays shall be marked with the serial number. Marking shall appear with the bottom of the print adjacent to the near side.
9. Socket pin terminals shall provide the operational, environmental, and interface characteristics to provide a reliable interconnect to gold-plated contacts. Terminals shall be gold plated. One system for gold plating that may be used is ASTM B488, type 3, class 1.25 with a nickel underplate of 50 to 150 microinches thick. The gold plating system shall enable the product to meet the performance requirements of this specification and shall be approved by the qualifying activity.
10. Gasket shall provide a reliable seal between the relay and mating socket that will meet the environmental, operational, and interface requirements of the relay with the mating socket. The gasket shall have shore hardness 25 ± 5 , thickness $.040 \pm .005$. Gasket material according to AMS 3332 has been considered acceptable.

FIGURE 1. Relay, outline drawing - Continued.

REQUIREMENTS

CONTACT DATA:

Life: Unless otherwise specified: 100,000 cycles.

Operational reliability: Applicable; the alternate low level method shall be used. 1/ 2/ 3/

Load ratings:

High level (relay case grounded):

Resistive: 5 amperes at 28 V dc, 115 V ac, 400 Hz, 1 phase; 115/200 V ac, 400 Hz, 3 phase.

Inductive: 3 amperes at 28 V dc, 5 amperes at 115 V ac, 400 Hz, 1 phase; 115 V ac, 400 Hz, 3 phase.
(Life: 20,000 cycles.)

Motor: 2 amperes at 28 V dc, 3 amperes at 115 V ac, 400 Hz, 1 phase; 115 V ac, 400 Hz, 3 phase.

Lamp: 1 ampere at 28 V dc.

Low level: 10 to 50 μ A at 10 to 50 mV dc or peak ac. 1/ 2/ 3/

Intermediate current: Applicable.

Transfer load: Not applicable.

Mechanical life (reduced current): 1.25 amperes at 28 V dc, 115 V ac, 1 phase and 3 phase
(Life: 400,000 cycles.)

Mixed loads: Applicable. 1/

Contact voltage drop or resistance: 2/ 3/

High level:

Initial: 0.150 volt maximum.
After life: 0.175 volt maximum.

Low level:

Initial: 0.050 ohm maximum.
After life: 0.150 ohm maximum.

Contact bounce: 0.5 millisecond maximum.

1/ Relay shall be capable of switching low level while switching any of the other rated loads on adjacent contacts.

2/ For low level, the following shall apply:

- a. During endurance and operational reliability testing, contact load shall be 10 to 50 microamperes; 10 to 50 millivolts open circuit voltage, 100 ohms maximum contact resistance.
- b. Static contact resistance shall be performed at 50 mA maximum, 50 mV maximum.

3/ For group A contact voltage drop test, high level testing shall be performed first, followed by low level testing. The contacts shall not make or break the high level load.

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Overload current: 20 amperes dc.
30 amperes ac.

Rupture current: 25 amperes dc.
40 amperes ac.

Time current relay characteristics: Applicable (see table I).

TABLE I. Time current relay characteristics. 1/ 2/

| | | |
|---|--------|------------|
| 1 | 10 A | 1 hour |
| 2 | 15 A | 20 seconds |
| 3 | 37.5 A | 2 seconds |
| 4 | 75 A | .53 second |

- 1/ CAUTION: Compare with time current characteristics of the associated circuit protective device.
- 2/ ALL relays shall withstand overload and fault currents. Relays must be able to sustain five applications (make and carry only) of power concurrently on adjacent poles at each of four different current levels in the sequence listed in table I. Separate relays shall be tested at 28 V dc and 115/200 V ac, 400 Hz, 3 phase. Cooling time between successive applications shall be 30 minutes. Tests shall be performed on both normally applications shall be 30 minutes. Tests shall be performed on both normally open and normally closed contacts. There shall be no failures or evidence of open and normally closed contacts. There shall be no failures or evidence of open and normally closed contacts. There shall be no failures or evidence of open and normally closed contacts. There shall be no failures or evidence of welding or sticking and relays shall pass contact voltage drop at the conclusion.

COIL DATA 4/: (See table II.)

Operate time: 4 milliseconds maximum with rated coil voltage.

Duty rating: Continuous.

ELECTRICAL DATA:

Insulation resistance, initial: 100 megohms.

After life or environmental tests: 50 megohms.

4/ CAUTION: Due to possible interaction of relay magnetic fields, the following spacing requirements, as a minimum, shall be considered in dense packaging situations:

- Row to row assisting fields: .125 inch.
- Row to row opposing fields: .1875 inch.
- Side to side alternating fields: .0625 inch.
- Side to side like fields: .125 inch.

5/ Dielectric may be improved by suitable insulation of terminals and wiring after installation.

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Dielectric withstanding voltage (sea level):

| | Initial V rms (60 Hz) | After life tests V rms (60 Hz) |
|------------------|--------------------------|-----------------------------------|
| Coil to case | 500 | 350 |
| Coil to coil | 500 | 350 |
| All other points | 1,000 | 750 |

Dielectric withstanding voltage (altitude):

| | 80,000 feet V rms (60 Hz) | 300,000 ft V rms (60 Hz) |
|------------------|------------------------------|-----------------------------|
| Coil to case | 200 V rms | 375 V rms |
| Coil to coil | 200 V rms | 375 V rms |
| All other points | 250 V rms | 500 V rms |

TABLE II. Dash numbers and characteristics. 1/

| Military PIN M6106/ 38- | Terminal type | Mounting config. | Coil data | | | | | | |
|----------------------------------|------------------|---------------------|--|---|--------------------------------|--------------|---------------------|----------------------|-------------------------------|
| | | | Rated voltage (V dc) <u>2</u> | Resist- ance $\Omega \pm 10\%$ at 25°C | Maximum | | Pickup volt (max) | | |
| | | | | | Voltage (V dc) <u>3/</u> | Current A | Normal <u>4/</u> | High temp test | Continuing current test |
| 001 | Solder hook | A | 28 | 730 | 29 | .044 | 18 | 19.8 | 22.5 |
| 002 | Socket pin | A | " | " | " | " | " | " | " |
| 003 | Solder pin | A | " | " | " | " | " | " | " |
| 004 | Solder hook | C | " | " | " | " | " | " | " |
| 005 | Solder pin | B | " | " | " | " | " | " | " |
| 006 | Solder pin | C | " | " | " | " | " | " | " |

1/ Each relay possesses high level and low level capabilities. However, relays previously tested or used above 10 mA resistive at 6 V dc maximum or peak ac open circuits are not recommended for subsequent use in low level applications.

2/ CAUTION: Use of any coil voltage less than rated coil voltage will compromise the operation of the relay.

3/ When maximum ambient temperature does not exceed +85°C, the maximum coil voltage shall be 32 V dc.

4/ Over the temperature range.

ENVIRONMENTAL CHARACTERISTICS:

Temperature range: -70°C to +125°C.

Maximum altitude rating: 300,000 feet.

Shock (specified pulse): MIL-STD-202, method 213, test condition C, except peak value shall be 200 g's. Contact chatter shall not exceed 10 microseconds for closed contacts and 1 microsecond maximum for open contacts.

Vibration (sinusoidal): Applicable; 30 g's maximum and frequency range shall be 70 to 3,000 Hz. Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum for open contacts.

Vibration (random): MIL-STD-202, method 214, test condition IG, (0.4G²/Hz 50-2,000 Hz), 15 minutes each plane.

Acceleration: Applicable (15 g's maximum).

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PHYSICAL DATA:

Strength of terminals and mounting studs: Applicable.

Terminal solderability: Applicable to solder pin and solder hook terminals only.

Dimensions and configurations: See figure 1.

Weight (maximum): .036 pound (16.34 grams).

Seal: Hermetic; relays shall be sealed by welding (laser, TIG (tungsten inert gas) or other suitable means as approved by the qualifying activity).

Construction (internal and external): ALL welded, except that coil magnet wire to coil lead wire shall be soldered.

PART NUMBER: M6106/38- (dash number from table II).

Qualification by similarity: See MIL-PRF-6106.

Custodian:
Air Force - 11
DLA - CC

Preparing activity:
DLA - CC

Review activities:
Air Force - 99

(Project 5945-1113-12)